FEHR PEERS

Draft Memorandum

Date: September 10, 2024

To: The City of Sumner

From: Steven Goodsell, Grace Horvath, Anjum Bawa – Fehr & Peers

Subject: Pierce County Library System – Sumner Library Traffic Impact Analysis

TC24-0109

Summary of Findings

Fehr & Peers performed a Traffic Impact Analysis (TIA) for the development of a Pierce County Library branch in Sumner, Washington. The proposed library site is located across from Fred Meyer on Main Street E. The current Pierce County Library branch is situated at 1116 Fryar Avenue in Sumner which is approximately 1.5 miles from the proposed site. The proposed library site access will be off 153rd Avenue Court E through the existing business easement. This site relocation aims to offer improved access and services to the Sumner community.

The TIA evaluated existing conditions in accordance with City of Sumner guidelines. This included conducting an operations analysis at three study intersections during the weekday PM peak hour traffic. The TIA aimed to identify potential transportation impacts for weekday PM peak traffic resulting from the library's development and identify any necessary mitigations. Additionally, the analysis assessed a mid-block pedestrian crossing near the site and provided a parking assessment summarizing the anticipated parking demand and impacts of the proposed library.

Conservative trip generation rates were used to determine worst-case impacts on the surrounding roads. Vehicle trips generated by the library were determined based on historical data for similar land uses documented in ITE Trip Generation Manual, 11th Edition. The project is expected to generate a total of 144 trips (69 inbound/75 outbound) in the PM Peak hour

Table 1 shows a summary of intersection Level of Service (LOS) results at the study intersections for Existing (2024), Existing Plus-Project (2024), No-Build 2029 5-Year Horizon, and 2029 5-Year Horizon Plus-Project scenarios.

Table 1. Weekday PM Peak Hour Intersection Level of Service Summary

Intersection			Existing	Existing Plus Project	2029 No-Build	2029 Plus Project
ID	Location	Control[1]	LOS / Delay (s)[2]	LOS / Delay (s)	LOS / Delay (s)	LOS / Delay (s)
1	Valley Avenue & Main Street E	Signal	D / 41	D / 42	D / 45	D / 46
2	153rd Avenue Court E & Main Street	SSSC	B/ 13 (NBL)	C / 15 (NBL)	B/ 13 (NBL)	C / 16 (NBL)
3	Graham Avenue & Main Street E	TWSC	C/ 18 (NB)	C / 20 (NB)	C / 21 (SBL)	C / 22 (SBL)
4	153rd Avenue Court E & Site Access	SSSC	-	A / 9 (EBL)	-	A / 9 (EBL)

Notes:

1. AWSC – All-Way Stop-control, TWSC – Two-Way Stop-Control, SSSC – Side-Street Stop-control
2. For TWSC and SSSC intersections, the highest delay movement is reported in parentheses. NB – Northbound, SB – Southbound, EB – Eastbound, WB – Westbound, L – Left, R – Right

Source: Fehr & Peers, 2024.

The number of parking spaces proposed for this project is estimated at 54 spaces, with the assumption that some of the trips generated to the library will be pick-up/drop-off only and will have little consequence for parking. Out of the total parking supply, five parking spaces will be on-street parking on Main Street E. The ITE Parking Generation manual recommends an average parking demand rate of 2.35 spaces per 1,000 square feet of gross floor area (GFA). Using this rate, the library could generate a parking demand of 41 spaces. The proposed supply will accommodate estimated parking demand. The existing business parking easement to the east will provide access to 153rd Avenue Court E. The existing easement is sufficient for egress and ingress traffic.

Based on mid-block pedestrian count data collected for this TIA between Valley Avenue and 153rd Avenue Court E on Main Street E, there is an existing need for mid-block crossing treatments. The shared use path across from the proposed site ends at the north side of Main Street E without a crossing. Given the existing need for a mid-block crossing at this location, a pedestrian crossing at the location of the shared use path crossing Main Street E is recommended. Pierce County Library Systems will work with the City of Sumner to determine the best course of action.

Project Background

The proposed library site is located across from Fred Meyer on Main Street E. The current Pierce County Library branch is situated at 1116 Fryar Avenue in Sumner which is approximately 1.5 miles from the proposed site on Main Street E. Access to the proposed library will be provided

from 153rd Avenue Court E through an existing business access easement in place. This relocation aims to offer improved access and services to the Sumner community.

Main Street between Valley Avenue and Graham Avenue is mainly a commercial zone supporting a range of commercial activities including retail, office, and services to cater to both residents and visitors. Beyond this segment of Main Street E, there are zones designated for residential land uses supporting different types of housing including single-family homes and multi-family units. Parking around Main Street includes a mix of on-street and off-street options to accommodate the needs of commercial and residential zones. The proposed site will be adjacent to retail and office uses on the south side of Main Street E.

Proposed site access will connect to 153rd Avenue Court E to avoid additional driveways on Main Street. The access will be provided through an existing office parking lot easement to the east of the lot with access to 153rd Avenue Court E.

Analysis Methodology

The weekday PM peak hour was selected as the analysis period for the study. This represents the time when traffic is generally highest on the surrounding roadway network; the analysis of impacts during this period reflects the highest impact for a given study intersection. The AM peak hour was not included in the analysis because the library will open after the morning commute period.

This study analyzes traffic conditions at the study intersections using Level of Service (LOS) as the primary measure of operational performance. LOS is a quantitative measure of traffic flow reported on a scale from A to F, representing the least and greatest delay respectively.

Table 2 briefly describes each LOS letter designation and an accompanying average delay per vehicle for signalized and unsignalized intersections per Highway Capacity Manual 6th Edition (HCM 6th). This methodology consists of different quantitative evaluations for different types of intersections. For signalized and all-way stop-controlled intersections, the LOS is provided for the overall intersection (weighted average of all approach delays). In contrast, only the worst movement delay is reported for two-way stop-controlled intersections (including side-street stop-controlled). The tabulated LOS thresholds were utilized to evaluate traffic operations at the study intersections, with LOS D as the standard for the City of Sumner except for a few specific intersections with LOS F as the standard.

Table 2. Intersection Level of Service Definitions

Level of Service	Description	Signalized Intersection Delay (seconds)	Unsignalized Intersection Delay (seconds)
A	Free-flowing Conditions	≤ 10	0-10
B	Stable Flow (slight delays)	>10-20	>10-15
C	Stable Flow (acceptable delays)	>20-35	>15-25
D	Approaching Unstable Flow (tolerable delay)	>35-55	>25-35
E	Unstable Flow (intolerable delay)	>55-80	>35-50
F	Forced Flow (congested and queues fail to clear)	>80	>50

Source: Highway Capacity Manual (HCM), 6th Edition

Existing Conditions

Purpose

This section documents the current state of traffic operations, active transportation, transit, parking, and crash data around the future site. This analysis establishes a baseline from which to compare project conditions near-term (Existing Plus Project scenario) and 5-year horizon conditions with and without the project (2029 No-Build and 2029 Plus-Project scenarios).

Traffic Conditions

Traffic Volumes

Vehicle, pedestrian, and bicycle counts were collected by a traffic count vendor during the weekday PM peak period (4:00-6:00 PM) on Thursday May 14th, 2024, for the following intersections:

1. Valley Avenue & Main Street E – signalized intersection
2. 153rd Avenue Court E & Main Street E – side-street stop-controlled (SSSC)
3. Graham Avenue & Main Street E – two-way stop controlled (TWSC)

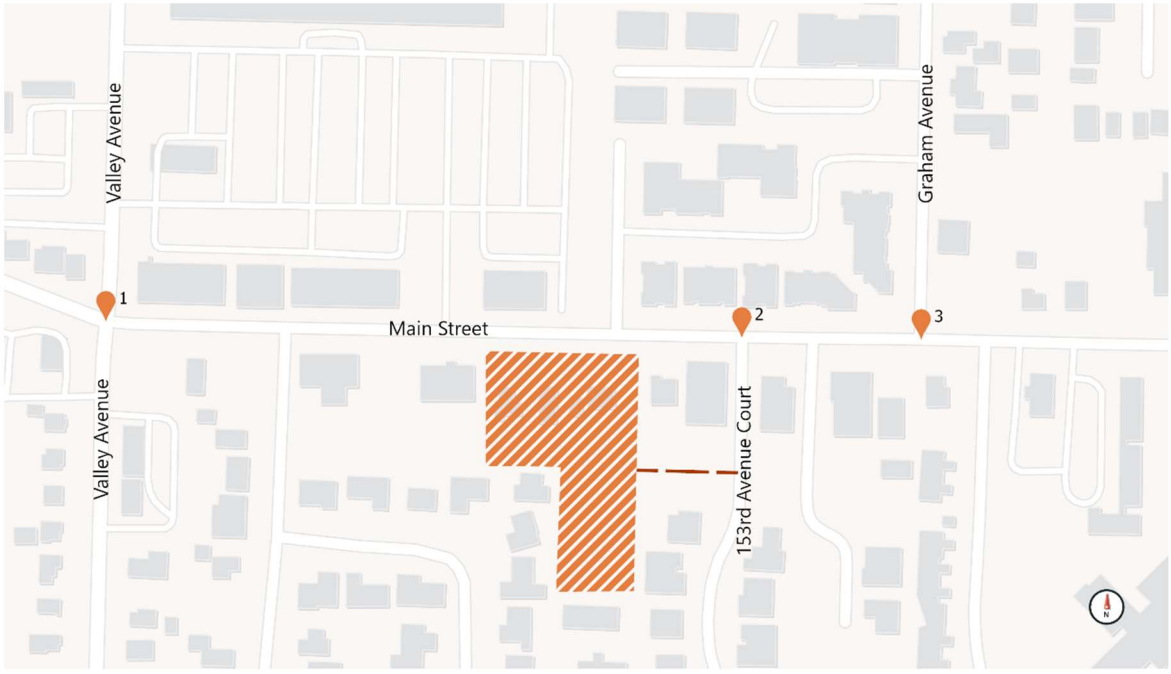
Vehicle counts were collected during the weekday PM peak period (4:00-6:00 PM) on Monday July 29th, 2024, for the following driveway:

4. 153rd Avenue Court E & the proposed site access

Based on the data collected, the PM peak hours for the intersections fell between 4:15-5:30 PM. These traffic counts are summarized in **Figure 1**, with detailed count information provided in

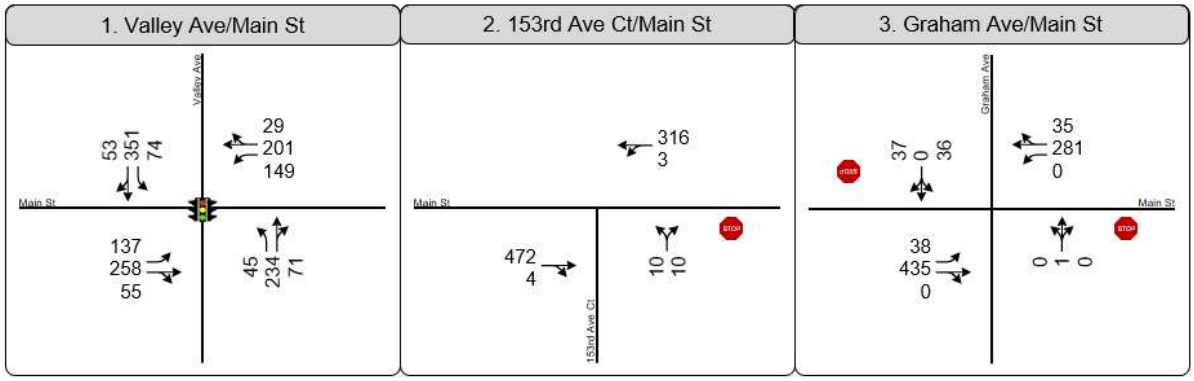
Appendix A. After collecting vehicle counts at intersection 4, volume balancing was performed to calibrate the observed conditions at intersection 4 with those observed at intersection 2. Volumes for turning movements at intersection 2 were increased as part of volume balancing. The posted speed limit is 25 miles per hour (mph) on Main Street E, Valley Avenue E, 153rd Avenue Court and Graham Avenue within the study area.

Figure 1. Existing Volumes at Study Intersections



Study Intersections
Library Site
Proposed Site Access

Sumner Library TIA
Library Site & Study Intersections



Traffic Operations

Existing weekday PM peak hour intersection LOS was calculated using Synchro 11 software and HCM 6th Edition methodology. A summary of the analysis results is provided in **Table 3**. **Appendix B** contains detailed LOS reports. According to the City of Sumner 2020 Comprehensive Plan, the intersection LOS standard is LOS D or better. The plan lists a few exceptions to the standard, including the study intersection at Valley Avenue & Main Street E, which is LOS F. Under existing conditions, all study intersections operate at LOS D or better.

Table 3. Weekday PM Peak Hour Intersection LOS - 2024 Existing Conditions

ID	Location	Control[1]	LOS / Delay (s)[2]
1	Valley Avenue & Main Street E	Signal	D / 41
2	153rd Avenue Court E & Main Street	SSSC	B / 13 (NBL)
3	Graham Avenue & Main Street E	TWSC	C / 18 (NB)

Notes:

1. AWSC – All-Way Stop-control, TWSC – Two-Way Stop-Control, SSSC – Side-Street Stop-control
2. For TWSC and SSSC intersections, the highest delay movement is reported in parentheses. NB – Northbound, SB – Southbound, EB – Eastbound, WB – Westbound, L – Left, R – Right

Source: Fehr & Peers, 2024.

Active Transportation

Pedestrian and bicycle counts were collected at the study intersections and along Main Street E during weekday PM peak hours. From 4:00 PM to 6:00 PM, 24 people were observed crossing Main Street E between Valley Avenue and 153rd Avenue Court E mid-block (at unmarked locations). The highest pedestrian traffic was observed at Valley Avenue & Main Street E, accounting for a total of 62 crossings. At the other two study intersections (153rd Ave Court E & Main Street E and Graham Avenue & Main Street E) a total of 21 crossings were observed. Pedestrian facilities are frequently used in this area and crossings occur on Main Street E even without pedestrian amenities. There are bike lanes on Valley Avenue south of Main Street E and sidewalks along Valley Avenue and Main Street E. 153rd Avenue Court E has a sidewalk on the east side of the street. There is a shared use path north of Main Street across from the proposed site, running north-south between Main Street E and Washington Street. This path is between commercial buildings and residential units and runs parallel to the 153rd Avenue Court E. At the location where the shared use path intersects Main Street E, there is no crosswalk.

Transit

The proposed site is not within the Pierce Transit Transportation Benefit Area, so there are no bus stops besides Sound Transit's Sumner Station. Sumner Station is situated approximately 1 mile west of the site, and offers transportation via Routes 578, 596, and the Sounder Commuter Train. The station provides leased bike lockers, free bike racks, facilitating park-and-ride options, and parking including a parking garage currently under construction. The Sounder South Train

operates weekdays between King Street Station in Seattle and Lakewood Station, running between 4:36 AM and 7:46 PM with 20-minute northbound headways during peak travel times. Route 578 runs from Puyallup to Seattle, with weekday service available from 4:56 AM to 12:16 AM. Route 596 offers service from Sumner to Bonney Lake between 4:50 AM and 7:28 PM.

Parking

Parking around Main Street E includes a mix of on-street and off-street options to accommodate the needs of both commercial and residential zones. There are approximately 15 on-street parking spaces along Main Street E adjacent to the site, which are convenient for short-term visits to nearby businesses and services. Additionally, off-street parking is provided by commercial and residential areas, with almost 1,000 spaces situated within parking lots and designated areas adjacent to businesses and homes. The parking lot for businesses across from the proposed site was observed to be underutilized. The office parking lot east of the proposed site has about 25 marked spaces with easement at the south of the property for egress and ingress traffic.

Safety

WSDOT maintains a database of crashes that includes information related to location characteristics, crash type, contributing circumstances, and other factors related to crashes that have occurred. Crash data for the last 5 available years (2019-2023) was reviewed to determine the types of crashes that occur at or near the study intersections. A total of 11 vehicle collisions were reported between Valley Avenue and Graham Avenue along Main Street, out of which five involved possible injuries. **Table 4** breaks down the collisions by location and severity.

Table 4. Study Area Crashes 2019-2023

Location	Total Crashes	No Apparent Injury	Possible Injury
Valley Avenue & Main Street	5	3	2
153rd Avenue Court E & Main Street	1	1	0
Graham Avenue & Main Street	2	0	2
Between Valley Avenue and Graham Street along Main Street	3	2	1

Source: WSDOT Crash Data, Fehr & Peers, 2024.

Planned Roadway Improvements

The City of Sumner's Transportation Improvement Program (TIP) details one arterial project adjacent to the study area. Valley Avenue from SR 410 to Main Street is projected to receive an overlay to the existing roadway surface as well as required ADA upgrades with construction scheduled to begin in 2026. No control improvements are planned at study intersections.

Existing 2024 Plus-Project Conditions

Purpose

The existing year 2024 traffic operations were analyzed with the addition of project traffic. The purpose of identifying Existing Plus-Project intersection operations is to compare existing conditions with traffic impacts due to the addition of project traffic if the library were to be built near-term.

Trip Generation

Trip generation for the library development was determined based on historical data documented in the ITE Trip Generation Manual, 11th Edition for similar land use during the PM peak hour. With a proposed square footage of 17,500 square feet, a total of 144 trips (69 inbound/75 outbound) are estimated during the PM peak hour.

Parking

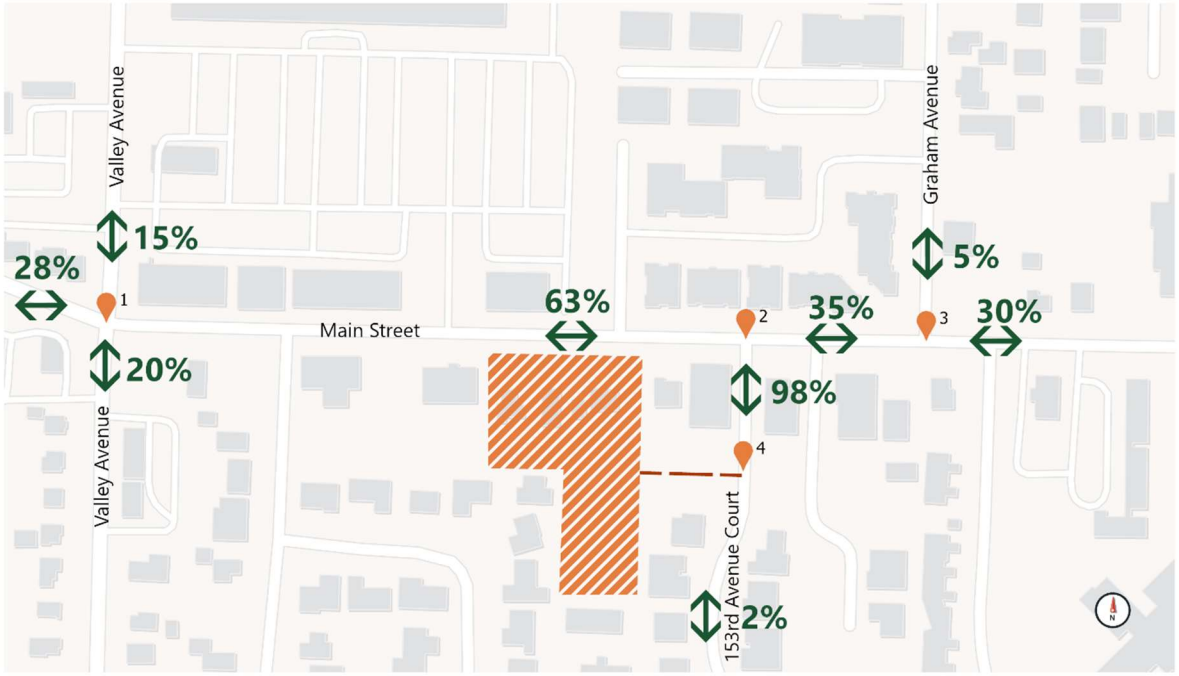
The proposed library site is slated to include 54 parking spaces with access to the existing driveway to the east of the site off of 153rd Avenue Court E. The site plans included five on-street parking spaces on Main Street E, directly in front of the library. According to the ITE Parking Generation 5th Edition, the average parking demand per 1,000 square feet for libraries on a weekday is 2.35. The proposed number of 54 spaces will adequately serve the estimated demand of 41 spaces using the aforementioned rate. The proposed number of spaces is consistent with the parking available at the current location of the Sumner Library on Fryar Avenue.

The proposed library site access to 153rd Avenue Court E will serve as a combined driveway providing access to more than two properties. The current 24-foot easement and 25-stall parking area serves businesses to the east of the site. The library parking lot would be an extension of the existing parking lot with access in line with the existing easement and spaces designated for library visitors. Striping and signage treatments are recommended to improve visibility, wayfinding, and circulation.

Trip Distribution and Assignment

The trips generated by the library development were distributed and assigned to the three study intersections based on existing intersection counts, the surrounding road network, nearby land uses, and population densities. Based on these factors, it is anticipated that trips generated by the site will distribute to the study area as shown in **Figure 2**. **Figure 3** represents project trips in addition to existing traffic if the project were built near-term.

Figure 2. Project Volumes at Study Intersections



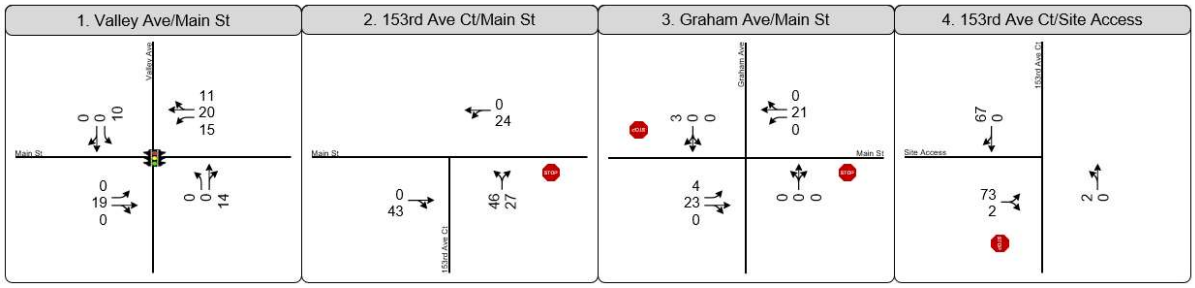
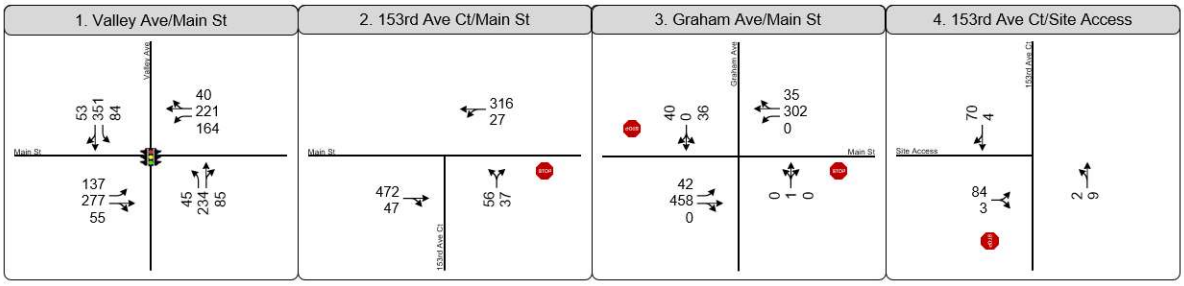


Figure 3. Existing Plus-Project Volumes at Study Intersections



Traffic Operations

Table 5 shows weekday PM peak hour traffic operations for Existing 2024 Plus-Project conditions. As indicated in **Table 5**, all study intersections maintained the same level of service as Existing year 2024 conditions. The additional project trips spread over 3 study intersections had minimal impact on operations. The site access was also added as a study intersection to assess the impact of project trips at the existing easement. **Appendix C** provides more detailed LOS results from Synchro 11 software.

Table 5. Weekday PM Peak Hour Intersection LOS – 2024 Existing Year Plus Project

ID	Location	Control[1]	LOS / Delay (s)[2]
1	Valley Avenue & Main Street E	Signal	D / 42
2	153rd Avenue Court E & Main Street	SSSC	C / 15 (NBL)
3	Graham Avenue & Main Street E	TWSC	C / 20 (NB)
4	153rd Avenue Court E & Site Access	SSSC	A / 9 (EBL)

Notes:

1. AWSC – All-Way Stop-control, TWSC – Two-Way Stop-Control, SSSC – Side-Street Stop-control
2. For TWSC and SSSC intersections, the highest delay movement is reported in parentheses. NB – Northbound, SB – Southbound, EB – Eastbound, WB – Westbound, L – Left, R – Right

Source: Fehr & Peers, 2024.

Pedestrian Crossing

Pedestrian crossing data for the PM peak hour showed existing pedestrian traffic in vicinity of the proposed library site. Over 100 crossings were observed at or between the three study intersections, with 24 occurring mid-block (not at a marked crossing) between Valley Avenue and 153rd Avenue Court E. The library is expected to generate additional pedestrian trips. The shared use path that runs north-south between Main Street E and Washington Street ends directly across Main Street E from the proposed library site. There is currently not a marked crosswalk to serve

the existing need or connect the proposed site to the shared use path. If path users wish to cross Main Street at a marked crossing, they would need to travel east to the Main Street & Graham Avenue intersection 500 feet away or west to the Main Street & Valley Avenue intersection 750 feet away. Given the existing mid-block crossing need, a pedestrian crossing is recommended.

There is a mid-block crossing located a third of a mile further east on Main Street, between Parker Road and 160th Avenue E. This mid-block crosswalk with a pedestrian island connects retail on either side of Main Street E. A similar treatment with high visibility features at the proposed crossing location in **Figure 4** would more safely allow people to cross mid-block and connect people to the library from the north side of Main Street from various retail establishments and high-density residential areas. *Further analysis and design will be necessary before implementation of a final pedestrian crossing recommendation***.**

Figure 4. Potential Mid-Block Pedestrian Crossing Location

2029 No-Build Conditions

Purpose

The 2029 5-year horizon traffic operations were forecasted without project traffic. The purpose of identifying 2029 No-Build intersection operations is to compare traffic impacts due to background traffic growth to impacts resulting from the addition of project traffic.

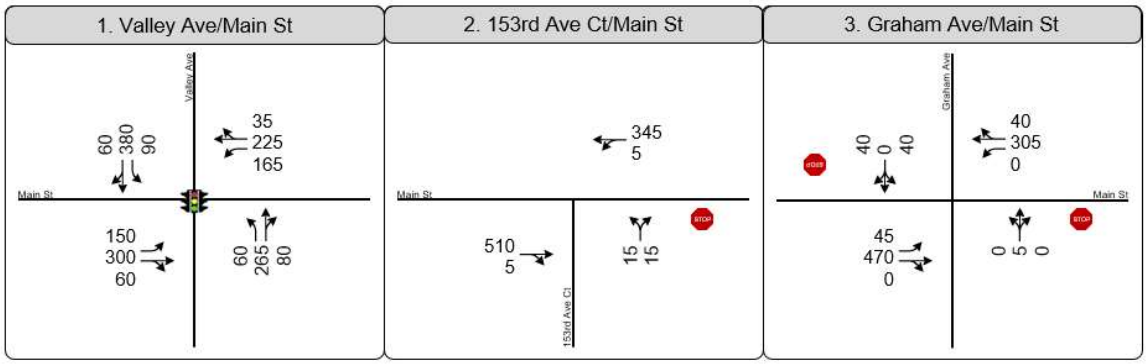
Forecasted Conditions

Planned projects included in the future conditions:

- 7-Eleven gas station and convenience store: on the southeast corner of Main Street & Valley Avenue with three access points. This site is estimated to generate an additional 30 trips at Main Street & Valley Avenue during the PM peak hour. Construction is expected to be complete in 2025.

An annual traffic growth rate of 1.5% was used to develop 5-year horizon forecasted volumes for the study intersections. This growth rate has historically been used in TIAs for the City of Sumner. Volume balancing was performed as part of the forecast development to calibrate the forecast to observed conditions. **Figure 5** shows the forecasted intersection volumes assuming five years of traffic growth. The vehicle volume from the 7-Eleven project at the study intersections was included in the forecast analysis. Approximately 300 new trips were added to the study intersections by applying the 1.5% growth rate and pipeline project trips.

Figure 5. 2029 No-Build Volumes at Study Intersections



Traffic Operations

Table 6 shows weekday PM traffic operations for 2029 No-Build conditions. As indicated in this table, all study intersections maintained the same LOS as Existing conditions, with increases in delay ranging from 1-4 seconds across the study intersections. The additional 300 forecasted trips spread over 3 study intersections had minimal impact on operations. More detailed LOS results from Synchro 11 software are provided in **Appendix D**.

Table 6. Weekday PM Peak Hour Intersection LOS - 2029 No-Build

ID	Location	Control[1]	LOS / Delay (s)[2]
1	Valley Avenue & Main Street E	Signal	D / 45
2	153rd Avenue Court E & Main Street	SSSC	B / 13 (NBL)
3	Graham Avenue & Main Street E	TWSC	C / 21 (SB)

Notes:

1. AWSC – All-Way Stop-control, TWSC – Two-Way Stop-Control, SSSC – Side-Street Stop-control
2. For TWSC and SSSC intersections, the highest delay movement is reported in parentheses. NB – Northbound, SB – Southbound, EB – Eastbound, WB – Westbound, L – Left, R – Right

Source: Fehr & Peers, 2024.

2029 Plus-Project Conditions

Purpose

The 2029 Plus-Project conditions represent 2029 No-Build conditions with the addition of project vehicle trips. Plus-Project conditions were analyzed to determine potential traffic impacts due to trips to and from the library during the weekday PM peak analysis period in the future. Project trips were added to the 2029 forecasted volumes. See **Figure 6** for 2029 Plus-Project study intersection volumes.

Figure 6. 2029 Plus-Project Volumes at Study Intersections

Traffic Operations

Table 7 shows weekday PM traffic operations for Plus-Project conditions. Each of the study intersections showed an LOS increase of 4-5 seconds compared to existing conditions. Compared to the existing SSSC at 153rd Avenue Court E & Main Street E, LOS increases from LOS B and 12 seconds of delay to LOS C and 16 seconds of delay. More detailed LOS results from Synchro 11 software are in **Appendix E**. There were no study intersections exceeding the City of Sumner's standard of LOS D for the 2029 Plus-Project condition assuming current traffic controls.

Table 7. Weekday PM Peak Hour Intersection LOS - 2029 Plus-Project

ID	Location	Control[1]	LOS / Delay (s)[2]
1	Valley Avenue & Main Street E	Signal	D / 46
2	153rd Avenue Court E & Main Street E	SSSC	C / 16 (NBL)
3	Graham Avenue & Main Street E	TWSC	C / 22 (SB)
4	153rd Avenue Court E & Site Access	SSSC	A / 9 (EBL)

Notes:

1. AWSC – All-Way Stop-control, TWSC – Two-Way Stop-Control, SSSC – Side-Street Stop-control
2. For TWSC and SSSC intersections, the highest delay movement is reported in parentheses. NB – Northbound, SB – Southbound, EB – Eastbound, WB – Westbound, L – Left, R – Right

Source: Fehr & Peers, 2024.

Mitigations and Recommendations

Traffic

No traffic mitigations were warranted based on the LOS impact analysis conducted for the proposed library project under Existing Plus-Project and 2029 Plus-Project conditions.

Parking

It is recommended that the project work with adjacent properties to implement pavement marking along the access easement to reinforce the aisle as a two-way path that connects the library to 153rd Avenue Court E. This will help motorists parking adjacent to the easement aisle to keep the path clear so as to not impede continuous access to the library patrons and emergency vehicles. Other parking striping and signage treatments to improve visibility, wayfinding, and circulation could include:

- Wayfinding signage on private and public right-of-way to aid Library visitors from Main Street E to the Library's parking lot and signage for pick-up and drop-off locations.
- Curb or/and pavement markings to indicate parking time-restricts, loading/unloading zones, and direction of traffic flow within the parking lot

It is recommended that Pierce County Library Systems work with the City and adjacent property owners to design and implement the above traffic control and wayfinding treatments prior to occupancy.

Pedestrian

Based on our assessment of existing conditions including pedestrian crossing counts, a high visibility mid-block pedestrian crossing is recommended on Main Street E at the site location.

Pierce County Library Systems will work with the City of Sumner to understand how they can support the City in identifying the best course of action.

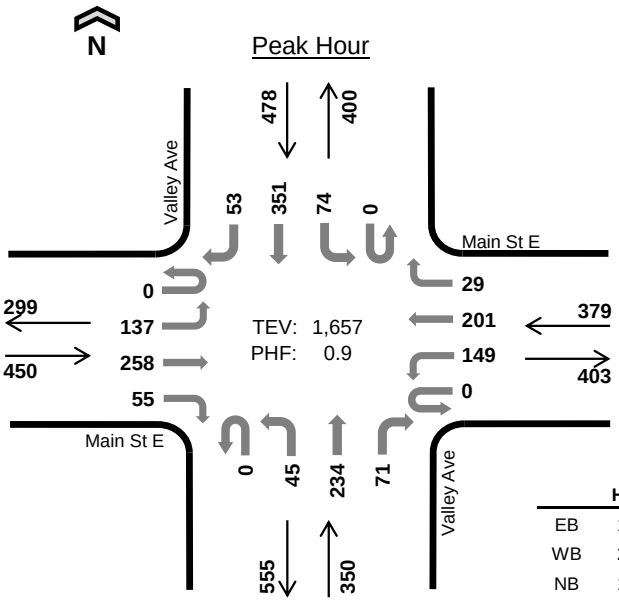
Conclusion

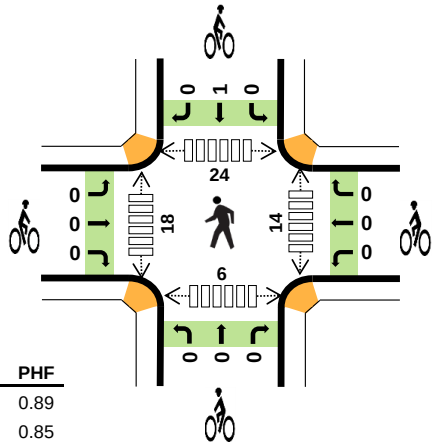
The proposed project will not result in any significant impacts to the study intersections under any scenarios. The existing parking lot easement to the east of the site at 153rd Avenue Court E is sufficient to provide vehicular access to the site. We recommend that the Pierce County Library System work with City to adjacent property owner to plan, design, and implement a wayfinding, curb and pavement marking plan to facilitate access for library patrons and maintain continuous access and circulation to the library via the parking lot easement. Pierce County Library Systems will discuss potential mid-block pedestrian crossing treatments with the City of Sumner to address existing need for a safe crossing on Main Street E.

Appendix A – Traffic Counts

Valley Ave
Main St E

Date: 05/14/2024
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM





	HV %:	PHF
EB	1.8%	0.89
WB	2.1%	0.85
NB	1.7%	0.90
SB	1.7%	0.92
TOTAL	1.8%	0.90

Two-Hour Count Summaries

Interval Start		Main St E Eastbound				Main St E Westbound				Valley Ave Northbound				Valley Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	32	61	12	0	25	42	11	0	9	61	24	0	19	70	15	381	0
4:15 PM		**0**	**29**	**58**	**18**	**0**	**34**	**39**	**5**	**0**	**12**	**71**	**14**	**0**	**19**	**83**	**17**	**399**	0
4:30 PM		**0**	**39**	**71**	**16**	**0**	**43**	**61**	**8**	**0**	**9**	**62**	**19**	**0**	**27**	**89**	**14**	**458**	0
4:45 PM		**0**	**36**	**59**	**11**	**0**	**28**	**47**	**6**	**0**	**8**	**56**	**19**	**0**	**16**	**98**	**11**	**395**	1,633
5:00 PM		**0**	**33**	**70**	**10**	**0**	**44**	**54**	**10**	**0**	**16**	**45**	**19**	**0**	**12**	**81**	**11**	**405**	**1,657**
5:15 PM		0	39	68	14	0	34	42	7	0	6	57	16	0	10	91	9	393	1,651
5:30 PM		0	29	42	9	0	41	43	9	0	13	68	23	0	15	93	18	403	1,596
5:45 PM		0	32	70	13	0	36	41	8	0	15	66	12	0	7	48	21	369	1,570
Count Total		0	269	499	103	0	285	369	64	0	88	486	146	0	125	653	116	3,203	0
Peak Hour	**All**	**0**	**137**	**258**	**55**	**0**	**149**	**201**	**29**	**0**	**45**	**234**	**71**	**0**	**74**	**351**	**53**	**1,657**	**0**
	HV	**0**	**4**	**3**	**1**	**0**	**2**	**5**	**1**	**0**	**1**	**4**	**1**	**0**	**2**	**6**	**0**	**30**	**0**
	HV%	**-**	**3%**	**1%**	**2%**	**-**	**1%**	**2%**	**3%**	**-**	**2%**	**2%**	**1%**	**-**	**3%**	**2%**	**0%**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	3	0	1	*5*	0	0	0	0	*0*	1	7	10	2	*20*
4:15 PM	**1**	**1**	**1**	**2**	***5***	**0**	**0**	**0**	**0**	***0***	**7**	**6**	**5**	**3**	*21*
4:30 PM	**4**	**2**	**0**	**2**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**8**	**8**	**1**	*17*
4:45 PM	**3**	**0**	**2**	**0**	***5***	**0**	**0**	**0**	**0**	***0***	**3**	**2**	**7**	**1**	*13*
5:00 PM	**0**	**5**	**3**	**4**	***12***	**0**	**0**	**0**	**1**	***1***	**4**	**2**	**4**	**1**	***11***
5:15 PM	1	0	0	1	*2*	0	0	0	0	*0*	2	4	2	2	*10*
5:30 PM	0	1	2	3	*6*	1	0	0	0	*1*	3	0	1	1	*5*
5:45 PM	2	0	0	0	*2*	0	0	0	0	*0*	3	0	2	3	*8*
Count Total	12	12	8	13	*45*	1	0	0	1	*2*	23	29	39	14	*105*
Peak Hour	**8**	**8**	**6**	**8**	***30***	**0**	**0**	**0**	**1**	***1***	**14**	**18**	**24**	**6**	***62***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Main St E Eastbound				Main St E Westbound				Valley Ave Northbound				Valley Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	1	0	2	0	1	0	0	0	0	0	0	1	0	5	0
4:15 PM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**5**	0
4:30 PM	**0**	**2**	**1**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**8**	0
4:45 PM	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**5**	23
5:00 PM	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**1**	**0**	**0**	**2**	**1**	**0**	**0**	**4**	**0**	**12**	**30**
5:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	2	27
5:30 PM	0	0	0	0	0	1	0	0	0	0	2	0	0	0	3	0	6	25
5:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	22
Count Total	0	4	5	3	0	5	5	2	0	1	6	1	0	3	10	0	45	0
Peak Hour	**0**	**4**	**3**	**1**	**0**	**2**	**5**	**1**	**0**	**1**	**4**	**1**	**0**	**2**	**6**	**0**	**30**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Main St E Eastbound			Main St E Westbound			Valley Ave Northbound			Valley Ave Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**1**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	1	0	0	0	0	0	0	0	0	0	1	0	2	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**

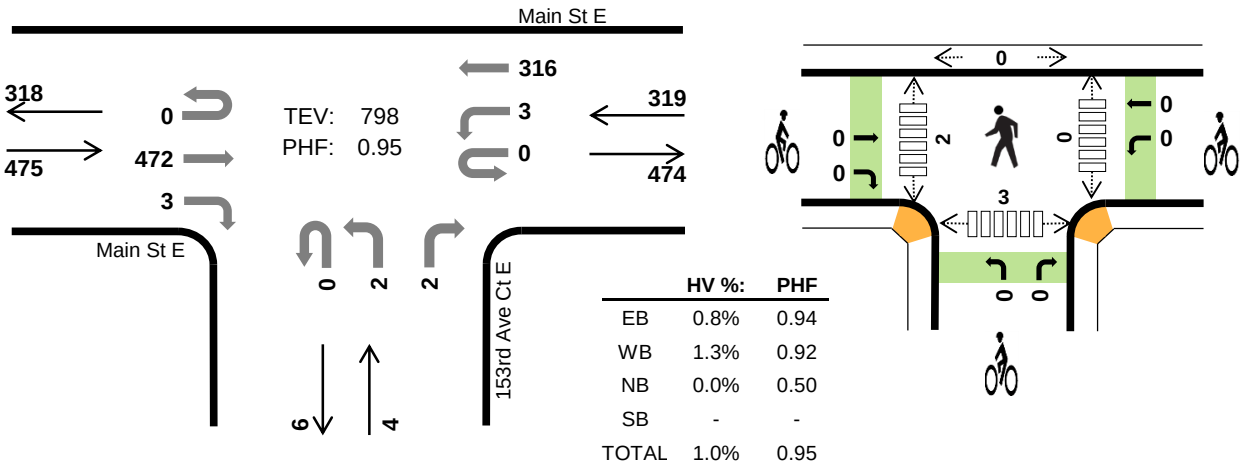
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

153rd Ave Ct E
Main St E

N

Peak Hour

Date: 05/14/2024
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	0.8%	0.94
WB	1.3%	0.92
NB	0.0%	0.50
SB	-	-
TOTAL	1.0%	0.95

Two-Hour Count Summaries

Interval Start		Main St E Eastbound				Main St E Westbound				153rd Ave Ct E Northbound				0 Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	0	118	0	0	2	67	0	0	2	0	0	0	0	0	0	189	0
4:15 PM		0	0	106	1	0	0	61	0	0	0	0	0	0	0	0	0	168	0
4:30 PM		**0**	**0**	**124**	**3**	**0**	**0**	**81**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**210**	0
4:45 PM		**0**	**0**	**115**	**0**	**0**	**2**	**75**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**194**	761
5:00 PM		**0**	**0**	**121**	**0**	**0**	**0**	**87**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**208**	780
5:15 PM		**0**	**0**	**112**	**0**	**0**	**1**	**73**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**186**	**798**
5:30 PM		0	0	109	1	0	0	80	0	0	1	0	0	0	0	0	0	191	779
5:45 PM		0	0	101	2	0	1	81	0	0	2	0	0	0	0	0	0	187	772
Count Total		0	0	906	7	0	6	605	0	0	7	0	2	0	0	0	0	1,533	0
Peak Hour	**All**	**0**	**0**	**472**	**3**	**0**	**3**	**316**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**0**	**0**	**798**	**0**
	HV	**0**	**0**	**4**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**
	HV%	**-**	**-**	**1%**	**0%**	**-**	**0%**	**1%**	**-**	**-**	**0%**	**-**	**0%**	**-**	**-**	**-**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	3	0	0	*3*	0	0	0	0	*0*	0	0	0	5	*5*
4:15 PM	2	0	0	0	*2*	0	0	0	0	*0*	0	1	0	3	*4*
4:30 PM	**1**	**1**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
4:45 PM	**2**	**2**	**0**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**2**	*2*
5:00 PM	**1**	**1**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**1**	*2*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	2	0	0	0	*2*	0	0	0	0	*0*	0	0	0	1	*1*
Count Total	9	7	0	0	*16*	0	0	0	0	*0*	0	3	0	12	*15*
Peak Hr	**4**	**4**	**0**	**0**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**3**	***5***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Main St E				Main St E				153rd Ave Ct E				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0
4:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
4:30 PM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	0
4:45 PM	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	11
5:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	10
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**
5:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7
5:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5
Count Total	0	0	9	0	0	0	7	0	0	0	0	0	0	0	0	0	16	0
Peak Hour	**0**	**0**	**4**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**

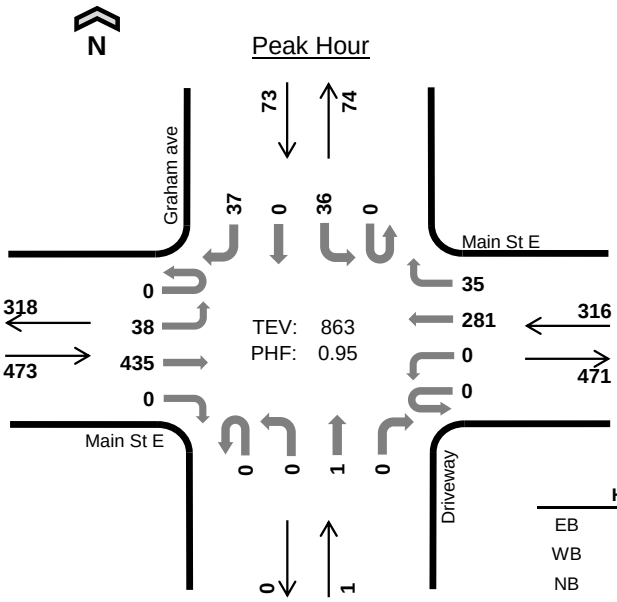
Two-Hour Count Summaries - Bikes

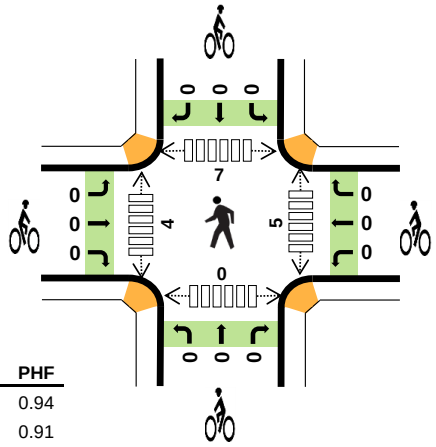
Interval Start	Main St E			Main St E			153rd Ave Ct E			0			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Graham ave
Main St E

Date: 05/14/2024
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM





	HV %:	PHF
EB	0.8%	0.94
WB	0.9%	0.91
NB	0.0%	0.25
SB	4.1%	0.83
TOTAL	1.2%	0.95

Two-Hour Count Summaries

Interval Start		Main St E Eastbound				Main St E Westbound				Driveway Northbound				Graham ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	7	110	0	0	0	59	3	0	0	0	1	0	13	0	9	202	0
4:15 PM		0	4	104	0	0	0	52	6	0	0	0	0	0	5	0	9	180	0
4:30 PM		**0**	**12**	**114**	**0**	**0**	**0**	**75**	**2**	**0**	**0**	**1**	**0**	**0**	**9**	**0**	**9**	**222**	0
4:45 PM		**0**	**7**	**108**	**0**	**0**	**0**	**61**	**5**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**13**	**200**	804
5:00 PM		**0**	**7**	**111**	**0**	**0**	**0**	**78**	**8**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**10**	**226**	828
5:15 PM		**0**	**12**	**102**	**0**	**0**	**0**	**67**	**20**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**5**	**215**	**863**
5:30 PM		0	11	99	0	0	0	73	14	0	0	0	0	0	7	0	5	209	850
5:45 PM		0	6	93	0	0	0	76	7	0	0	0	0	0	4	0	6	192	842
Count Total		0	66	841	0	0	0	541	65	0	0	1	1	0	65	0	66	1,646	0
Peak Hour	**All**	**0**	**38**	**435**	**0**	**0**	**0**	**281**	**35**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**37**	**863**	**0**
	HV	**0**	**1**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**1**	**10**	**0**
	HV%	**-**	**3%**	**1%**	**-**	**-**	**-**	**1%**	**0%**	**-**	**-**	**0%**	**-**	**-**	**6%**	**-**	**3%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	0	1	*3*	0	0	0	0	*0*	0	0	1	0	*1*
4:15 PM	2	0	0	0	*2*	0	0	0	0	*0*	0	3	4	0	*7*
4:30 PM	**1**	**1**	**0**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**4**	**3**	**2**	**0**	*9*
4:45 PM	**2**	**1**	**0**	**2**	***5***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	*1*
5:00 PM	**1**	**1**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**4**	**0**	***5***
5:30 PM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	1	0	*1*
5:45 PM	2	0	0	0	*2*	0	0	0	0	*0*	0	1	2	0	*3*
Count Total	9	5	0	4	*18*	0	0	0	0	*0*	5	8	15	0	*28*
Peak Hour	**4**	**3**	**0**	**3**	***10***	**0**	**0**	**0**	**0**	***0***	**5**	**4**	**7**	**0**	***16***

Two-Hour Count Summaries - Heavy Vehicles

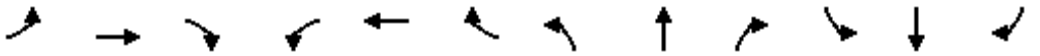
Interval Start	Main St E Eastbound				Main St E Westbound				Driveway Northbound				Graham ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	3	0
4:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
4:30 PM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**3**	0
4:45 PM	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**5**	13
5:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	12
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10**
5:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
5:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5
Count Total	0	1	8	0	0	0	5	0	0	0	0	0	0	2	0	2	18	0
Peak Hour	**0**	**1**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**1**	**10**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Main St E Eastbound			Main St E Westbound			Driveway Northbound			Graham ave Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Appendix B – Existing Traffic Operations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	258	55	149	201	29	45	234	71	74	351	53
Future Volume (veh/h)	137	258	55	149	201	29	45	234	71	74	351	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	0.99		0.96	1.00		0.97	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1885	1870	1885	1870	1856	1870	1870	1885	1856	1870	1900
Adj Flow Rate, veh/h	154	290	62	175	236	34	50	260	79	80	382	58
Peak Hour Factor	0.89	0.89	0.89	0.85	0.85	0.85	0.90	0.90	0.90	0.92	0.92	0.92
Percent Heavy Veh, %	3	1	2	1	2	3	2	2	1	3	2	0
Cap, veh/h	463	459	98	408	489	70	342	420	128	408	484	74
Arrive On Green	0.12	0.31	0.31	0.12	0.31	0.31	0.12	0.31	0.31	0.12	0.31	0.31
Sat Flow, veh/h	1767	1493	319	1795	1589	229	1781	1366	415	1767	1574	239
Grp Volume(v), veh/h	154	0	352	175	0	270	50	0	339	80	0	440
Grp Sat Flow(s),veh/h/ln	1767	0	1812	1795	0	1818	1781	0	1781	1767	0	1813
Q Serve(g_s), s	7.2	0.0	21.7	8.1	0.0	15.7	2.2	0.0	21.2	3.6	0.0	28.9
Cycle Q Clear(g_c), s	7.2	0.0	21.7	8.1	0.0	15.7	2.2	0.0	21.2	3.6	0.0	28.9
Prop In Lane	1.00		0.18	1.00		0.13	1.00		0.23	1.00		0.13
Lane Grp Cap(c), veh/h	463	0	558	408	0	559	342	0	548	408	0	558
V/C Ratio(X)	0.33	0.00	0.63	0.43	0.00	0.48	0.15	0.00	0.62	0.20	0.00	0.79
Avail Cap(c_a), veh/h	463	0	558	408	0	559	342	0	548	408	0	558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	38.7	26.2	0.0	36.6	25.6	0.0	38.5	24.5	0.0	41.1
Incr Delay (d2), s/veh	1.9	0.0	5.4	3.3	0.0	3.0	0.9	0.0	5.2	1.1	0.0	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	10.6	3.9	0.0	7.5	1.0	0.0	10.1	1.6	0.0	14.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.7	0.0	44.0	29.4	0.0	39.6	26.5	0.0	43.7	25.6	0.0	52.0
LnGrp LOS	C	A	D	C	A	D	C	A	D	C	A	D
Approach Vol, veh/h		506			445			389			520	
Approach Delay, s/veh		38.8			35.6			41.5			47.9	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	45.0	20.0	45.0	20.0	45.0	20.0	45.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.0	40.0	15.0	40.0	15.0	40.0	15.0	40.0
Max Q Clear Time (g_c+I1), s	10.1	23.7	5.6	23.2	9.2	17.7	4.2	30.9
Green Ext Time (p_c), s	0.1	1.7	0.1	1.7	0.1	1.4	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	41.1
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	472	4	3	316	10	10
Future Vol, veh/h	472	4	3	316	10	10
Conflicting Peds, #/hr	0	3	0	0	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	92	92	92	92
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	502	4	3	343	11	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	509	0	858	507
Stage 1	-	-	-	-	507	-
Stage 2	-	-	-	-	351	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1066	-	330	570
Stage 1	-	-	-	-	609	-
Stage 2	-	-	-	-	717	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1063	-	327	568
Mov Cap-2 Maneuver	-	-	-	-	447	-
Stage 1	-	-	-	-	607	-
Stage 2	-	-	-	-	713	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	500	-	-	1063	-
HCM Lane V/C Ratio	0.043	-	-	0.003	-
HCM Control Delay (s)	12.5	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	2

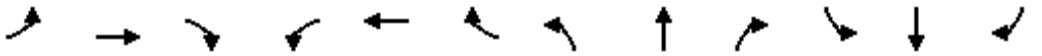
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	435	0	0	281	35	0	1	0	36	0	37
Future Vol, veh/h	38	435	0	0	281	35	0	1	0	36	0	37
Conflicting Peds, #/hr	7	0	0	0	0	7	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	-	25	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	91	91	91	83	83	83	83	83	83
Heavy Vehicles, %	3	1	0	0	1	0	0	0	0	6	0	3
Mvmt Flow	40	463	0	0	309	38	0	1	0	43	0	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	354	0	0	463	0	0	898	897	468	884	878	339
Stage 1	-	-	-	-	-	-	543	543	-	335	335	-
Stage 2	-	-	-	-	-	-	355	354	-	549	543	-
Critical Hdwy	4.13	-	-	4.1	-	-	7.1	6.5	6.2	7.16	6.5	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.16	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.16	5.5	-
Follow-up Hdwy	2.227	-	-	2.2	-	-	3.5	4	3.3	3.554	4	3.327
Pot Cap-1 Maneuver	1199	-	-	1109	-	-	262	281	599	262	289	701
Stage 1	-	-	-	-	-	-	528	523	-	671	646	-
Stage 2	-	-	-	-	-	-	666	634	-	513	523	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1191	-	-	1109	-	-	238	269	596	252	277	694
Mov Cap-2 Maneuver	-	-	-	-	-	-	238	269	-	252	277	-
Stage 1	-	-	-	-	-	-	510	505	-	644	641	-
Stage 2	-	-	-	-	-	-	621	630	-	492	505	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0	18.4	17.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	269	1191	-	-	1109	-	-	372
HCM Lane V/C Ratio	0.004	0.034	-	-	-	-	-	0.236
HCM Control Delay (s)	18.4	8.1	-	-	0	-	-	17.6
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.9

Appendix C – Existing Plus-Project Traffic Operations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	277	55	164	221	40	45	234	85	84	351	53
Future Volume (veh/h)	137	277	55	164	221	40	45	234	85	84	351	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	1.00		0.97	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1885	1870	1885	1870	1856	1870	1870	1885	1856	1870	1900
Adj Flow Rate, veh/h	154	311	62	193	260	47	50	260	94	91	382	58
Peak Hour Factor	0.89	0.89	0.89	0.85	0.85	0.85	0.90	0.90	0.90	0.92	0.92	0.92
Percent Heavy Veh, %	3	1	2	1	2	3	2	2	1	3	2	0
Cap, veh/h	434	466	93	393	471	85	342	400	145	396	484	74
Arrive On Green	0.12	0.31	0.31	0.12	0.31	0.31	0.12	0.31	0.31	0.12	0.31	0.31
Sat Flow, veh/h	1767	1514	302	1795	1531	277	1781	1299	470	1767	1574	239
Grp Volume(v), veh/h	154	0	373	193	0	307	50	0	354	91	0	440
Grp Sat Flow(s),veh/h/ln	1767	0	1816	1795	0	1807	1781	0	1769	1767	0	1813
Q Serve(g_s), s	7.2	0.0	23.3	9.0	0.0	18.4	2.2	0.0	22.5	4.1	0.0	28.9
Cycle Q Clear(g_c), s	7.2	0.0	23.3	9.0	0.0	18.4	2.2	0.0	22.5	4.1	0.0	28.9
Prop In Lane	1.00		0.17	1.00		0.15	1.00		0.27	1.00		0.13
Lane Grp Cap(c), veh/h	434	0	559	393	0	556	342	0	544	396	0	558
V/C Ratio(X)	0.35	0.00	0.67	0.49	0.00	0.55	0.15	0.00	0.65	0.23	0.00	0.79
Avail Cap(c_a), veh/h	434	0	559	393	0	556	342	0	544	396	0	558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.2	0.0	39.2	26.8	0.0	37.5	25.6	0.0	38.9	25.0	0.0	41.1
Incr Delay (d2), s/veh	2.3	0.0	6.2	4.3	0.0	3.9	0.9	0.0	5.9	1.4	0.0	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	11.4	4.4	0.0	8.9	1.0	0.0	10.8	1.9	0.0	14.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.5	0.0	45.4	31.1	0.0	41.4	26.5	0.0	44.9	26.3	0.0	52.0
LnGrp LOS	C	A	D	C	A	D	C	A	D	C	A	D
Approach Vol, veh/h		527			500			404			531	
Approach Delay, s/veh		40.2			37.5			42.6			47.6	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	45.0	20.0	45.0	20.0	45.0	20.0	45.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.0	40.0	15.0	40.0	15.0	40.0	15.0	40.0
Max Q Clear Time (g_c+I1), s	11.0	25.3	6.1	24.5	9.2	20.4	4.2	30.9
Green Ext Time (p_c), s	0.1	1.7	0.1	1.7	0.1	1.5	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	42.0
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	472	47	27	316	56	37
Future Vol, veh/h	472	47	27	316	56	37
Conflicting Peds, #/hr	0	3	0	0	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	92	92	92	92
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	502	50	29	343	61	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	555	0	933	530
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	403	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1026	-	298	553
Stage 1	-	-	-	-	594	-
Stage 2	-	-	-	-	679	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1023	-	286	551
Mov Cap-2 Maneuver	-	-	-	-	414	-
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	654	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	15
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	459	-	-	1023	-
HCM Lane V/C Ratio	0.22	-	-	0.029	-
HCM Control Delay (s)	15	-	-	8.6	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	458	0	0	302	35	0	1	0	36	0	40
Future Vol, veh/h	42	458	0	0	302	35	0	1	0	36	0	40
Conflicting Peds, #/hr	7	0	0	0	0	7	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	-	25	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	91	91	91	83	83	83	83	83	83
Heavy Vehicles, %	3	1	0	0	1	0	0	0	0	6	0	3
Mvmt Flow	45	487	0	0	332	38	0	1	0	43	0	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	377	0	0	487	0	0	956	954	492	941	935	362
Stage 1	-	-	-	-	-	-	577	577	-	358	358	-
Stage 2	-	-	-	-	-	-	379	377	-	583	577	-
Critical Hdwy	4.13	-	-	4.1	-	-	7.1	6.5	6.2	7.16	6.5	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.16	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.16	5.5	-
Follow-up Hdwy	2.227	-	-	2.2	-	-	3.5	4	3.3	3.554	4	3.327
Pot Cap-1 Maneuver	1176	-	-	1086	-	-	240	261	581	239	267	680
Stage 1	-	-	-	-	-	-	506	505	-	652	631	-
Stage 2	-	-	-	-	-	-	647	619	-	491	505	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1168	-	-	1086	-	-	216	249	578	228	255	673
Mov Cap-2 Maneuver	-	-	-	-	-	-	216	249	-	228	255	-
Stage 1	-	-	-	-	-	-	486	485	-	623	627	-
Stage 2	-	-	-	-	-	-	598	615	-	469	485	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0	19.5	18.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	249	1168	-	-	1086	-	-	350
HCM Lane V/C Ratio	0.005	0.038	-	-	-	-	-	0.262
HCM Control Delay (s)	19.5	8.2	-	-	0	-	-	18.9
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	1

Intersection	
Int Delay, s/veh	4.7

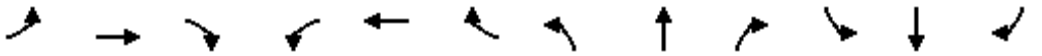
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	84	3	2	9	4	70
Future Vol, veh/h	84	3	2	9	4	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	3	2	10	4	76

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	56	42	80	0	-	0
Stage 1	42	-	-	-	-	-
Stage 2	14	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	952	1029	1518	-	-	-
Stage 1	980	-	-	-	-	-
Stage 2	1009	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	951	1029	1518	-	-	-
Mov Cap-2 Maneuver	951	-	-	-	-	-
Stage 1	979	-	-	-	-	-
Stage 2	1009	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	1.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1518	-	953	-	-
HCM Lane V/C Ratio	0.001	-	0.099	-	-
HCM Control Delay (s)	7.4	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Appendix D – 2029 No-Build Traffic Operations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	300	60	165	225	35	60	265	80	90	380	60
Future Volume (veh/h)	150	300	60	165	225	35	60	265	80	90	380	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	1.00		0.97	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1885	1870	1885	1870	1856	1870	1870	1885	1856	1870	1900
Adj Flow Rate, veh/h	169	337	67	194	265	41	67	294	89	98	413	65
Peak Hour Factor	0.89	0.89	0.89	0.85	0.85	0.85	0.90	0.90	0.90	0.92	0.92	0.92
Percent Heavy Veh, %	3	1	2	1	2	3	2	2	1	3	2	0
Cap, veh/h	436	466	93	371	484	75	315	421	127	376	481	76
Arrive On Green	0.12	0.31	0.31	0.12	0.31	0.31	0.12	0.31	0.31	0.12	0.31	0.31
Sat Flow, veh/h	1767	1515	301	1795	1572	243	1781	1367	414	1767	1565	246
Grp Volume(v), veh/h	169	0	404	194	0	306	67	0	383	98	0	478
Grp Sat Flow(s),veh/h/ln	1767	0	1817	1795	0	1815	1781	0	1781	1767	0	1811
Q Serve(g_s), s	7.9	0.0	25.7	9.1	0.0	18.3	2.9	0.0	24.7	4.4	0.0	32.3
Cycle Q Clear(g_c), s	7.9	0.0	25.7	9.1	0.0	18.3	2.9	0.0	24.7	4.4	0.0	32.3
Prop In Lane	1.00		0.17	1.00		0.13	1.00		0.23	1.00		0.14
Lane Grp Cap(c), veh/h	436	0	559	371	0	558	315	0	548	376	0	557
V/C Ratio(X)	0.39	0.00	0.72	0.52	0.00	0.55	0.21	0.00	0.70	0.26	0.00	0.86
Avail Cap(c_a), veh/h	436	0	559	371	0	558	315	0	548	376	0	557
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.4	0.0	40.1	27.4	0.0	37.5	26.8	0.0	39.7	25.5	0.0	42.3
Incr Delay (d2), s/veh	2.6	0.0	7.9	5.2	0.0	3.8	1.5	0.0	7.2	1.7	0.0	15.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	12.8	4.5	0.0	8.8	1.4	0.0	12.0	2.1	0.0	16.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.0	0.0	48.0	32.6	0.0	41.3	28.3	0.0	46.9	27.2	0.0	58.0
LnGrp LOS	C	A	D	C	A	D	C	A	D	C	A	E
Approach Vol, veh/h		573			500			450			576	
Approach Delay, s/veh		42.1			37.9			44.2			52.8	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	45.0	20.0	45.0	20.0	45.0	20.0	45.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.0	40.0	15.0	40.0	15.0	40.0	15.0	40.0
Max Q Clear Time (g_c+I1), s	11.1	27.7	6.4	26.7	9.9	20.3	4.9	34.3
Green Ext Time (p_c), s	0.1	1.8	0.1	1.7	0.1	1.5	0.1	1.3

Intersection Summary	
HCM 6th Ctrl Delay	44.5
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	510	5	5	345	15	15
Future Vol, veh/h	510	5	5	345	15	15
Conflicting Peds, #/hr	0	3	0	0	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	92	92	92	92
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	543	5	5	375	16	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	551	0	936	549
Stage 1	-	-	-	-	549	-
Stage 2	-	-	-	-	387	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1029	-	297	539
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1026	-	294	537
Mov Cap-2 Maneuver	-	-	-	-	419	-
Stage 1	-	-	-	-	581	-
Stage 2	-	-	-	-	685	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	1026	-
HCM Lane V/C Ratio	0.069	-	-	0.005	-
HCM Control Delay (s)	13.2	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	2.4

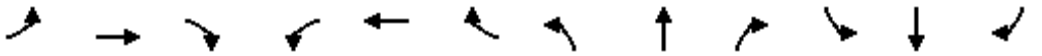
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	470	0	0	305	40	0	5	0	40	0	40
Future Vol, veh/h	45	470	0	0	305	40	0	5	0	40	0	40
Conflicting Peds, #/hr	7	0	0	0	0	7	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	-	25	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	91	91	91	83	83	83	83	83	83
Heavy Vehicles, %	3	1	0	0	1	0	0	0	0	6	0	3
Mvmt Flow	48	500	0	0	335	44	0	6	0	48	0	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	386	0	0	500	0	0	981	982	505	968	960	368
Stage 1	-	-	-	-	-	-	596	596	-	364	364	-
Stage 2	-	-	-	-	-	-	385	386	-	604	596	-
Critical Hdwy	4.13	-	-	4.1	-	-	7.1	6.5	6.2	7.16	6.5	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.16	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.16	5.5	-
Follow-up Hdwy	2.227	-	-	2.2	-	-	3.5	4	3.3	3.554	4	3.327
Pot Cap-1 Maneuver	1167	-	-	1075	-	-	231	251	571	229	259	675
Stage 1	-	-	-	-	-	-	494	495	-	647	627	-
Stage 2	-	-	-	-	-	-	642	614	-	478	495	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1159	-	-	1075	-	-	207	239	568	215	247	668
Mov Cap-2 Maneuver	-	-	-	-	-	-	207	239	-	215	247	-
Stage 1	-	-	-	-	-	-	474	475	-	616	623	-
Stage 2	-	-	-	-	-	-	593	610	-	450	475	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0	20.5	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	239	1159	-	-	1075	-	-	325
HCM Lane V/C Ratio	0.025	0.041	-	-	-	-	-	0.297
HCM Control Delay (s)	20.5	8.2	-	-	0	-	-	20.7
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	1.2

Appendix E – 2029 Plus-Project Traffic Operations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	319	60	180	245	46	60	265	94	100	380	60
Future Volume (veh/h)	150	319	60	180	245	46	60	265	94	100	380	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	1.00		0.97	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1885	1870	1885	1870	1856	1870	1870	1885	1856	1870	1900
Adj Flow Rate, veh/h	169	358	67	212	288	54	67	294	104	109	413	65
Peak Hour Factor	0.89	0.89	0.89	0.85	0.85	0.85	0.90	0.90	0.90	0.92	0.92	0.92
Percent Heavy Veh, %	3	1	2	1	2	3	2	2	1	3	2	0
Cap, veh/h	409	472	88	356	468	88	315	402	142	364	481	76
Arrive On Green	0.12	0.31	0.31	0.12	0.31	0.31	0.12	0.31	0.31	0.12	0.31	0.31
Sat Flow, veh/h	1767	1533	287	1795	1520	285	1781	1308	463	1767	1565	246
Grp Volume(v), veh/h	169	0	425	212	0	342	67	0	398	109	0	478
Grp Sat Flow(s),veh/h/ln	1767	0	1820	1795	0	1805	1781	0	1771	1767	0	1811
Q Serve(g_s), s	7.9	0.0	27.4	10.0	0.0	21.0	2.9	0.0	26.1	4.9	0.0	32.3
Cycle Q Clear(g_c), s	7.9	0.0	27.4	10.0	0.0	21.0	2.9	0.0	26.1	4.9	0.0	32.3
Prop In Lane	1.00		0.16	1.00		0.16	1.00		0.26	1.00		0.14
Lane Grp Cap(c), veh/h	409	0	560	356	0	556	315	0	545	364	0	557
V/C Ratio(X)	0.41	0.00	0.76	0.59	0.00	0.62	0.21	0.00	0.73	0.30	0.00	0.86
Avail Cap(c_a), veh/h	409	0	560	356	0	556	315	0	545	364	0	557
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.0	0.0	40.6	28.2	0.0	38.4	26.8	0.0	40.2	26.0	0.0	42.3
Incr Delay (d2), s/veh	3.1	0.0	9.3	7.1	0.0	5.0	1.5	0.0	8.4	2.1	0.0	15.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	13.8	5.1	0.0	10.2	1.4	0.0	12.7	2.3	0.0	16.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	50.0	35.4	0.0	43.5	28.3	0.0	48.6	28.1	0.0	58.0
LnGrp LOS	C	A	D	D	A	D	C	A	D	C	A	E
Approach Vol, veh/h		594			554			465			587	
Approach Delay, s/veh		44.0			40.4			45.7			52.4	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	45.0	20.0	45.0	20.0	45.0	20.0	45.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.0	40.0	15.0	40.0	15.0	40.0	15.0	40.0
Max Q Clear Time (g_c+I1), s	12.0	29.4	6.9	28.1	9.9	23.0	4.9	34.3
Green Ext Time (p_c), s	0.1	1.7	0.1	1.7	0.1	1.7	0.1	1.3

Intersection Summary	
HCM 6th Ctrl Delay	45.7
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	510	48	29	345	61	42
Future Vol, veh/h	510	48	29	345	61	42
Conflicting Peds, #/hr	0	3	0	0	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	92	92	92	92
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	543	51	32	375	66	46

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	597	0	1013	572
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	441	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	989	-	267	523
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	653	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	986	-	255	522
Mov Cap-2 Maneuver	-	-	-	-	387	-
Stage 1	-	-	-	-	567	-
Stage 2	-	-	-	-	625	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	433	-	-	986	-
HCM Lane V/C Ratio	0.259	-	-	0.032	-
HCM Control Delay (s)	16.2	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	493	0	0	326	40	0	5	0	40	0	43
Future Vol, veh/h	49	493	0	0	326	40	0	5	0	40	0	43
Conflicting Peds, #/hr	7	0	0	0	0	7	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	-	25	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	91	91	91	83	83	83	83	83	83
Heavy Vehicles, %	3	1	0	0	1	0	0	0	0	6	0	3
Mvmt Flow	52	524	0	0	358	44	0	6	0	48	0	52

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	409	0	0	524	0	0	1038	1037	529	1023	1015	391
Stage 1	-	-	-	-	-	-	628	628	-	387	387	-
Stage 2	-	-	-	-	-	-	410	409	-	636	628	-
Critical Hdwy	4.13	-	-	4.1	-	-	7.1	6.5	6.2	7.16	6.5	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.16	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.16	5.5	-
Follow-up Hdwy	2.227	-	-	2.2	-	-	3.5	4	3.3	3.554	4	3.327
Pot Cap-1 Maneuver	1144	-	-	1053	-	-	211	233	554	210	240	655
Stage 1	-	-	-	-	-	-	474	479	-	629	613	-
Stage 2	-	-	-	-	-	-	623	600	-	459	479	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1136	-	-	1053	-	-	187	221	551	196	227	648
Mov Cap-2 Maneuver	-	-	-	-	-	-	187	221	-	196	227	-
Stage 1	-	-	-	-	-	-	452	457	-	596	609	-
Stage 2	-	-	-	-	-	-	571	596	-	430	457	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0	21.7	22.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	221	1136	-	-	1053	-	-	307
HCM Lane V/C Ratio	0.027	0.046	-	-	-	-	-	0.326
HCM Control Delay (s)	21.7	8.3	-	-	0	-	-	22.3
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	1.4

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	88	7	2	10	5	72
Future Vol, veh/h	88	7	2	10	5	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	8	2	11	5	78

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	59	44	83	0	-	0
Stage 1	44	-	-	-	-	-
Stage 2	15	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	948	1026	1514	-	-	-
Stage 1	978	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	947	1026	1514	-	-	-
Mov Cap-2 Maneuver	947	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	1008	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	1.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1514	-	952	-	-
HCM Lane V/C Ratio	0.001	-	0.108	-	-
HCM Control Delay (s)	7.4	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-